

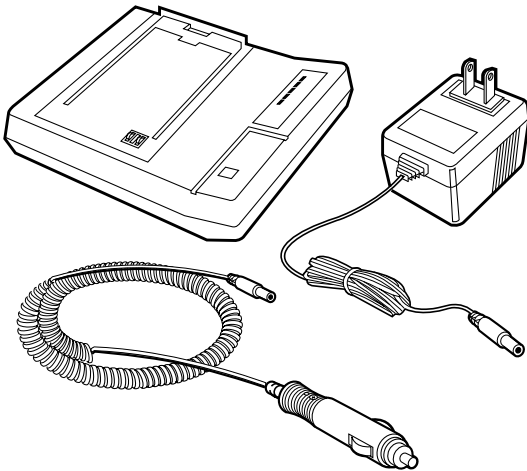


BLACK BOX
NETWORK SERVICES



FEBRUARY 1995
MC060A

Rapid Charger/Conditioner



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)

FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**

Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018

Web site: www.blackbox.com • E-mail: info@blackbox.com

**FEDERAL COMMUNICATIONS COMMISSION
AND
INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

**NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT**

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

1. Specifications

Input Voltage—	12–16 VDC, 100 mA (minimum for quick charge)
Output Voltage—	6V
Type of Charger—	Rapid with automatic fallback
Cut-off Control—	Microprocessor controlled four different ways (whichever is first): <ol style="list-style-type: none">1. $-\Delta V$2. $\frac{\Delta T}{\Delta t}$3. Max. T (104°F)4. t = 100 minutes ($\pm 10\%$)
Cut-off Delay—	3 minutes (minimum)
Conditioning Type—	Controlled discharge to 1V/Cell
Maintenance—	Pulse-width modulation; 10% duty cycle

2. Introduction

2.1 Overview

The Rapid Charger/Conditioner is a state-of-the-art electronic instrument. When used as directed, it can charge Nickel-Cadmium (NiCad) or Nickel-Metal-Hydride (NiMH) rechargeable battery packs in about 10% of the time it takes to charge the batteries with a conventional trickle charger.

IMPORTANT

Although most batteries are capable of being quick-charged, many require slow-charging before they can be quick-charged. The slow-charging process for the initial two or three charges properly conditions a new battery. Therefore, do not use this product for quick-charging new batteries. This product should only be used with preconditioned batteries or batteries that have been previously charged.

2.2 Using the Proper Batteries for Charging

Your battery package or the battery pack itself should contain information on the type of battery. It should specifically state that the battery pack is rechargeable and indicate that the battery is either a Nickel-Cadmium (NiCad) or a Nickel-Metal-Hydride (NiMH) rechargeable battery.

The Rapid Charger/Conditioner can charge most, but not all, batteries with the Nickel-Cadmium or Ni-Cd mark, as well as with the Nickel-Metal-Hydride or NiMH mark. Note that not all battery packs are made the same. Although most reputable battery manufacturers have incorporated built-in safety and temperature measuring devices into their batteries, some low-cost manufacturers skip these safety features to lower the cost of the battery.

WARNING

The use of this device with other than the correct Nickel-Cadmium or Nickel-Metal-Hydride rechargeable batteries may result in overheating, fire, or explosion. This device is NOT to be used with Lithium, Lead Acid, Lead Gel, Carbon-Zinc, Alkaline, Mercury, Silver Ion, or any battery type other than Nickel-Cadmium or Nickel-Metal-Hydride.

2.3 Temperature Sensitivity

Both Nickel-Cadmium and Nickel-Metal-Hydride batteries are very sensitive to temperature changes. These batteries should be used and charged at room temperature.

The use and charging of Nickel-Cadmium or Nickel-Metal-Hydride batteries in temperatures below 32°F or above 100°F (below 0°C or above 38°C) may damage the batteries.

For your protection, the Rapid Charger/Conditioner has a built-in safety device which will terminate the charge cycle when the internal temperature of the battery pack exceeds the safety limits.

2.4 Memory Effect and Conditioning

Nickel-Cadmium batteries need as much care as you give your portable cellular telephone. Nickel-Cadmium batteries that are removed prematurely from chargers or those that are not fully discharged through phone use can suffer from what is known as “memory effect.” This internal condition interferes with your phone’s performance, as it causes your battery to lose capacity and reduces the effective lifetime of the battery.

To reduce memory effect, always fully charge your battery. Always use your battery until it has run down (most cellular phones will indicate when your battery needs recharging). If you do not run your battery down, be sure to use the conditioning cycle of the Rapid Charger/Conditioner. The conditioning cycle will actually eliminate this memory effect and help restore the full power capability of your Nickel-Cadmium battery. It is advisable that you condition your Nickel-Cadmium battery at least one out of every three charges, or more often if you do not

completely discharge your battery before charging.

IMPORTANT

DO NOT CONDITION NICKEL-METAL-HYDRIDE (NiMH) RECHARGEABLE BATTERIES. Nickel-Metal-Hydride battery packs do not exhibit memory effect, and conditioning, therefore, is not necessary.

3. Operation

3.1 For Use in Your Home

For home use, the Rapid Charger/Conditioner uses the AC Adapter included in this package. Plug the small circular connector on the cord end of the AC Adapter into the Rapid Charger/Conditioner's appropriate receptacle. Then plug the AC Adapter into a 120-volt wall socket.

NOTE

The AC Adapter is designed for indoor use only. Be sure to place the Rapid Charger/Conditioner unit in a secure location, such as on a table or desk.

The state-of-the-art Rapid Charger/Conditioner is capable of going through two cycles: Rapid Charge Cycle, or Condition/Charge Cycle. The Rapid Charge Cycle can charge the Nickel-Cadmium or Nickel-Metal-Hydride battery in about 10% of the time (usually less than one hour) that it takes to charge by a conventional charger. The Condition/Charge Cycle will condition a Nickel-Cadmium battery (a Nickel-Metal-Hydride battery does not require conditioning), and then quick-charge your battery.

3.1.1 RAPID CHARGE CYCLE

Insert the appropriate Nickel-Cadmium or Nickel-Metal-Hydride rechargeable battery into its appropriate slot on the instrument. Insert your battery into the Rapid Charger/Conditioner the same way you insert it into your phone. The red STATUS Light should come on to indicate the start of the Charge Cycle. The yellow LEDs will light, indicating the amount of charge the battery has. A fully charged battery will light all the three yellow LEDs.

Note that different battery packs can behave differently.

When the Charge Cycle is completed, the three yellow LEDs will light, indicating the battery is fully charged. Your battery is now ready for use, and can be removed from the charger. If you keep the battery in the unit after completion of charging, the Charger/Conditioner will automatically go into a “maintenance” mode, where it will keep the battery fully charged until removed.

3.1.2 CONDITION/CHARGE CYCLE

(Recommended at least one out of every three charges)

The conditioning cycle of the Rapid Charger/Conditioner is designed for Nickel-Cadmium rechargeable batteries. *Do not condition Nickel-Metal-Hydrate batteries.* Because Nickel-Metal-Hydrate batteries do not suffer from memory effect, a condition common to Nickel-Cadmium batteries, there is no need to condition your Nickel-Metal-Hydrate battery.

Insert the Nickel-Cadmium battery into its appropriate slot on the Rapid Charger/Conditioner. Press the Condition button. The red Status and yellow Charge LEDs will go out and the yellow will light to indicate the start of the conditioning cycle. At the completion of the conditioning cycle, the yellow Conditioning light will go off and the red Charging light will go on, and the unit will automatically go into the “charge” mode. When the battery is fully charged, the three yellow charge-capacity LEDs will light to indicate a fully charged battery. You may now remove your battery from the Rapid Charger/Conditioner.

IMPORTANT

Avoid removing your battery or interrupting the Rapid Charge Cycle or the Condition/Charge Cycle until the battery is fully charged and the three yellow charge-capacity LEDs are on. When the battery is removed after charging, do not attempt to charge it again until the battery has run out of power. Make sure you keep the Rapid Charger/Conditioner instrument, the AC Adapter, and your battery away from sunlight, moisture, direct heat, or extreme cold. The use and charging of Nickel-Cadmium or Nickel-Metal-Hydrate batteries in temperatures below 32°F or above 100°F (below 0°C or above 38°C) may damage the batteries. The Rapid Charger/Conditioner is designed for indoor or in-vehicle use only.

WARNING

It is normal for some batteries to become warm during the operation of the Rapid Charger/Conditioner. It is *not* normal, however, for the battery to become hot (too hot to touch). If the battery becomes too hot, immediately unplug the power source, wait for the battery to cool, then remove it. **DO NOT ATTEMPT TO CHARGE THE BATTERY AGAIN.** A battery that gets hot is not suitable for quick-charging.

3.2 For Use in Your Vehicle

Place the Rapid Charger/Conditioner in a secure location. Make sure you have placed it in a location where: (1) the device will not fly and hit someone in case of a sudden stop or an accident; and (2) it does not interfere with the operation of your vehicle. Do not place the Rapid Charger/Conditioner on a vinyl seat, and do not leave your vehicle unattended while charging or conditioning.

For use in your vehicle, the Rapid Charger/Conditioner uses the Vehicle Adapter Cord included in this package. Plug the small circular connector on the Vehicle Adapter Cord into the Charger/Conditioner's appropriate receptacle. Then plug the adaptor end of the Vehicle Adapter Cord into an active cigarette lighter receptacle.

Read and carefully follow the instructions and warnings listed in **Section 3.1**.

NOTE

Once you have started the “Rapid Charge Cycle” or the “Condition/Charge Cycle,” it is important that you complete the cycle (the cycle is completed when the green Ready Indicator Light flashes) before removing your battery. Make sure the vibration of the vehicle will not cause the battery to slide out of its appropriate slot. Keep the Rapid Charger/Conditioner and your Nickel-Cadmium or Nickel-Metal-Hydride battery away from sunlight, moisture, direct heat, or extreme cold. The use and charging of Nickel-Cadmium or Nickel-Metal-Hydride batteries in temperatures below 32°F or above 100°F (below 0°C or above 38°C) may damage the batteries. *Do not attempt to monitor or handle the Rapid Charger/Conditioner while operating a motor vehicle.*



© Copyright 1995. Black Box Corporation. All rights reserved.

1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746